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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,238	12/21/2001	Mikio Oda	NEKU 19.296	3180

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EXAMINER

STULTZ, JESSICA T

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,238	ODA ET AL.	
	Examiner	Art Unit	
	Jessica T Stultz	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,6,7,12,14 and 21 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,8-11,13 and 15 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10, 11, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Brotz.

Regarding claim 10, Brotz discloses an optical path control apparatus comprising (Abstract, Column 2, line 44-Column 4, line 36, wherein the optical path control apparatus is shown in Figures 1-3); a substrate (Column 2, line 44-Column 4, line 36, wherein the substrate is the support member “12”, Figure 5, shown in Figures 1-3) and a mirror section movable relative to a surface of the substrate is provided on the substrate (Column 4, lines 31-49, wherein the mirror sections are “32”, “40” and “41” are movable relative to the second substrate “12”, Figures 2-3) and changes an optical path of reflection light to input light by moving a reflection angle of said mirror section with respect to said surface and by changing an angle between the reflective surface of the mirror section and the surface in response to an input signal (Column 3, line 61-Column 4, line 17, wherein the path of the beam from laser “28” changes by movement of the mirror “10” relative to the surface of the substrate “12”, or by the mirror sections “32”, “40”, and “41” respectively, Figure 1).

Specifically regarding claim 11, Brotz further discloses that the mirror section has two mirror portions (Column 4, lines 43-49, wherein the two mirror portions are “40” and “41”,

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Figure 3), wherein each of the portions comprises: a mirror layer provided as a surface layer (Column 4, lines 31-49, wherein the mirror layer is the reflective top surface, Figures 1-3); an underside layer provided under said mirror layer having a conductive wire (Column 3, lines 27-38, wherein the underside layer "12" has a ferromagnetic ring, Figures 2 and 4), wherein the two mirror portions attract or repel each other based on current as the input signal supplied to the conductive wires such that a reflection angle of said mirror section is changed (Column 5, lines 17-27, wherein the mirror sections "56" and "58" repel and attract, Figure 5).

Specifically regarding claim 13, Brotz discloses that the mirror section has two mirror portions (Column 4, lines 43-49, wherein the two mirror portions are "40" and "41", Figure 3), wherein each of the portions comprises: a mirror layer provided as a surface layer; (Column 4, lines 31-49, wherein the mirror layer is the reflective top surface, Figures 1-3); a magnetic layer provided under said mirror layer, (Column 3, lines 27-38, wherein the underside layer "12" is magnetic, Figures 2 and 4); wherein said two mirror portions attract or repel each other through magnetization of said magnetic layer based on said input signal such that a reflection angle of said mirror section is moved with respect to a surface of the substrate (Column 5, lines 17-27, wherein the mirror sections "56" and "58" repel and attract, Figure 5) and such that an angle between at least one of the two mirror portions and the substrate is changed (Column 5, lines 17-27, wherein the mirror sections "56" and "58" move and the angle of "56" changes with respect to the substrate "54", Figure 5)

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Regarding claim 15, Brotz further discloses that the mirror section of the optical path control apparatus is a triangular prism shaped thin film mirror (Column 2, line 44-Column 4, line 36, wherein the mirrors are "32", "40", and "41", Figures 2-3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1, 3-4, and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brotz in view of Muller et al.

Specifically regarding claim 1, Brotz discloses an optical path control apparatus comprising (Abstract, Column 2, line 44-Column 4, line 36, wherein the optical path control apparatus is shown in Figures 1-3): a first substrate (Column 2, lines 44-50, wherein the first substrate is "14", Figures 1-3); a second substrate which is movable relative to the first substrate (Column 2, line 44-Column 4, line 36, wherein the second substrate is the support member "12", Figure 5, shown in Figures 1-3); a mirror section provided on the second substrate to have a reflective surface with a fixedly predetermined angle with respect to a surface of the second substrate (Column 4, lines 31-49, wherein the mirror sections are "32", "40" and "41" which are fixed at an angle with respect to the surface of the second substrate "12", Figures 2-3); and a driving section which moves the second substrate such that a first optical path of input light to the mirror section is optically connected to one of a plurality of the second optical paths (Column 3, line 39-Column 4, line 17, wherein the driving section is the coils "20", "32", "68" and "70",

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Figures 1-3), but does not specifically disclose that the first substrate is in contact with the second substrate. Muller et al teaches of a mirror on a movable substrate within a scanning device (Column 3, line 54-Column 4, line 3, wherein the wherein the mirrored surface is “9” on the movable substrate “6” in the scanning device “1”, Figures 1-3) wherein the top substrate is in contact with the bottom substrate (Column 3, line 54-Column 4, line 3, wherein the bottom substrate is housing “2”, which is in contact with the mirrored substrate “6”, Figures 1-3) and moves relative to the bottom substrate (Column 3, line 54-Column 4, line 56, wherein the substrate “6” moves relative to the bottom substrate “2”, Figures 1-3) for the purpose of controlling the beam angle for proper scanning (Column 3, line 54-Column 4, line 56). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the optical path control apparatus of Brotz to further include the first substrate in contact with the second substrate since Muller et al teaches of a movable mirror on a substrate within a scanning device wherein the top substrate is in contact with the bottom substrate and moves relative to the bottom substrate for the purpose of controlling the beam angle for proper scanning.

Regarding claim 3, Brotz and Muller et al disclose and teach of a movable mirror as shown above and the examiner takes judicial notice that it is well known in the art of optical path control for the driving section to be an ultrasonic wave-generating source with a piezo-electric layer on the second substrate.

Regarding claim 4, Brotz and Muller et al disclose and teach of a movable mirror as shown above and Brotz further discloses an optical path control apparatus as is disclosed above wherein said driving means includes two electromagnets, said second substrate is a permanent

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magnet provided between said two electromagnets (Column 3, line 27-Column 4, line 17, wherein the electromagnets are coils “68” and “70” and support member “12” is magnetic, Figure 1), said permanent magnet is moved between two positions based on magnetic polarities of said two electromagnets (Column 3, line 27-Column 4, line 17, wherein the support member moves by the coils “68” and “70”, Figure 1), and said first optical path is optically connected to said second optical path associated with one of said positions (Column 3, line 61-Column 4, line 17, wherein the path of the beam from laser “28” changes by movement of the mirror “10”, or by the mirror sections “32”, “40”, and “41” respectively, Figure 1) .

Regarding claim 8, Brotz and Muller et al disclose and teach of a movable mirror as shown above and Brotz further discloses that the mirror section of the optical path control apparatus is a triangular prism shaped thin film mirror (Column 2, line 44-Column 4, line 36, wherein the mirrors are “32”, “40”, and “41”, Figures 2-3).

Regarding claim 9, Brotz and Muller et al disclose and teach of a movable mirror as shown above, but do not specifically disclose that the mirror section is a lump type. However, it is well known in the art of mirror shapes, that the lump type mirror and that the type of reflection desired determines the shape of the mirror. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the claimed mirror be lump type so that the mirror can fit the type of reflection desired.

Allowable Subject Matter

Claim 2, 6, 7, 12, 14 and 21 are allowed.

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Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: none of the prior art alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103.

Specifically regarding claim 2, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the driving means is an ultrasonic wave generating source, and specifically wherein said second substrate is moved by progressive waves generated by said ultrasonic wave generating source and is located on a position by standing waves and said first optical path is optically connected to said second optical path associated with said position.

Specifically regarding claim 5, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein the second substrate has a gear shape wherein the driving section has an electrostatic actuator and rotates said second substrate based on force generated by said electrostatic actuator such that said mirror section is rotated, or that first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section.

Specifically regarding claim 6, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein the second substrate has a micro-light wheel, the driving section has lasers, and the second substrate

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rotates based on laser beams emitted by said lasers, and said first optical path is optically connected to said second optical path associated with a rotation angle of said mirror section.

Specifically regarding claim 7, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein the second substrate is provided a concave section of the first substrate, wherein the concave section is filled with fluid; further wherein said driving section moves the second substrate by supplying the fluid from one end of the concave section and absorbing fluid from another end of the concave section, said mirror section reflects said input light based on the movement of the second substrate so that the first optical path is optically connected to the second optical path.

Specifically regarding claim 12, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the mirror section comprises: a mirror layer provided as a surface layer; and specifically a layer changing its shape in response to the input signal, an electrode layer provided under the layer changing its shape, wherein the mirror portion is transformed through transformation of the layer changing its shape in response to supply of the input signal such that a reflection angle of the mirror section is changed.

Specifically regarding claim 14, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above wherein the said mirror section comprises: a mirror layer provided as a surface layer; specifically a shape memory layer provided under said mirror layer, and a heating layer provided under said shape memory layer; wherein said mirror layer of said mirror section is transformed due to transformation of said

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shape memory layer through heating by said heating layer in response to said input signal such that a reflection angle of said mirror section is changed.

Specifically regarding claim 21, none of the prior art alone or in combination disclose or teach of the claimed optical path control apparatus as is disclosed above specifically wherein a mirror section is provided on a surface of the first substrate having a reflective surface with an angle larger than zero with respect to a surface of the first substrate.

Response to Arguments

Applicant's arguments with respect to claims 1, 3, 4, and 8-9 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed December 18, 2003 have been fully considered but they are not persuasive regarding claims 10-11, 13, and 15. Specifically, the examiner disagrees with the argument that Brotz does not disclose mirror sections wherein the angle between them and the substrate changes in response to an input signal. Brotz discloses the angles of the mirror sections changing in Figure 5.

Conclusion

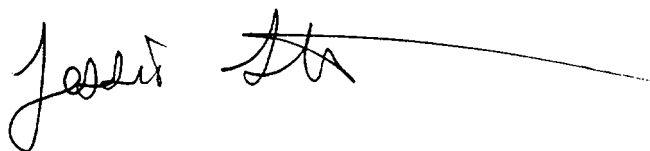
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T Stultz whose telephone number is (571) 272-2339. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 703-308-4883. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jessica Stultz
Patent Examiner
AU 2873
January 14, 2004

A handwritten signature in cursive script, appearing to read 'Jessica Stultz', followed by a long horizontal line extending to the right.A handwritten signature in cursive script, appearing to read 'Jordan Schwartz'.

JORDAN SCHWARTZ
PRIMARY EXAMINER